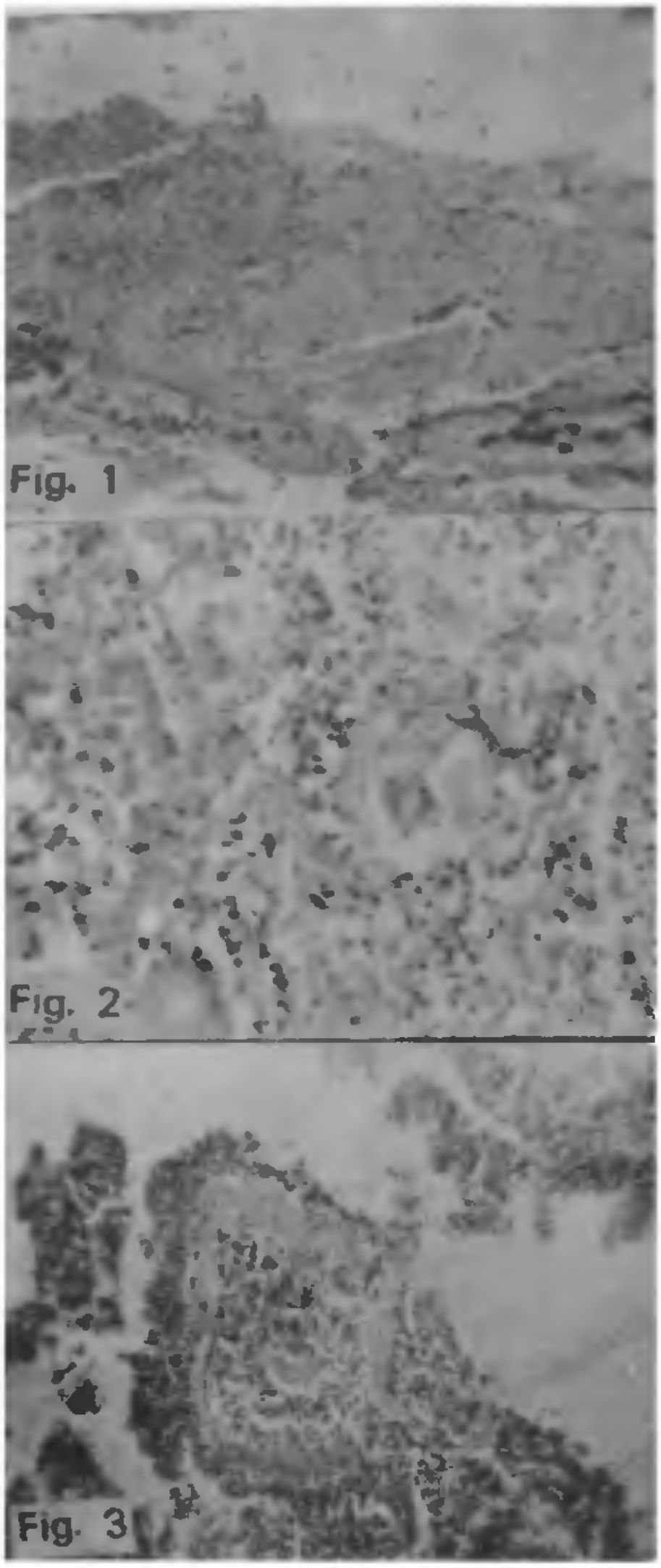

FIGS. 1–3. Fig. 1. T.S. of head kidney showing clumping of heamopoetic tissue. Fig. 2. T.S. of kidney showing shrinkage of glomerulus capillaries. Fig. 3. T.S. of kidney showing benign tumor.

ions through blood resulting in disorder of the excretory system.

Tumor formation in the kidney of the fish induced by cadmium is not reported so far. However, the development of a sacromatous tumor consisting of spindle-shaped cells has been reported by Kirkman and Bacon[8], Gange *et al.*[9] and Hendry *et al.*[10] after administration of some toxins.

Thus it may be concluded that sub-lethal concentration of cadmium chloride 15 mg/l may have carcinogenic effect on fish kidney.

The author is thankful to University Grants Commission for the financial assistance and to Sri Aditya Parashari for technical assistance provided.

December 26, 1930.

1. Badsha, K. S. and Sainsbury, M., *Mar. Pollut. Bull.*, 1977, 8, 164.
2. Dawson, M. A., Edith, G., Frederick, P. T, and Anthony, C., *Chesapeake Sci.*, 1977. 18 353.
3. Lobat, R., Roque lo, C., Richard, J. M., Lim, P. and Burgat, M., *Ann. Limnol.*, 1977, **13**, 191.
4. Mc Carty, L. S., Henry, J. A. and Houston, A. H., *J. Fish. Res. Board. Can.*, 1978, **35**, 35.
5. Pascoe, D. and Mattey, D. L., *J. Fish. Biol.*, 1977, **11**, 207.
6. Pflugfelder, O., *Peters. Arch. Entw. Meeh. Org.*, 1953, **146**, 115.
7. Rasquin, P. and Rosenbloom, L., *Bull. Am. Mus. Nat. Hist.*, 1954, **104**, 359.
8. Kirkman, H. and Bacon, R. L., *J. Natl. Cancer Inst.*, 1952, **13**, 751.
9. Gange, F., Poulin, M., Lacour, F. and Guerin, M., *Bull. Cancer*, 1954, **48**, 270.
10. Hendry, J. A., Mathews, J. J., Walpole, A. L. and Williams, M. H. C., *Nature*, 1955, **175**, 1131.

MYXOSOMA MATHURII N. SP. (PROTOZOA : MYXOSPORIDIA) PARASITIC ON *PUNTIUS SARANA* (HAM.)

M. JAYASRI, M. PARVATEESAM AND P. N. MATHUR
Department of Zoology, Government College
Ajmer 305 001, India

THE myxosporidian parasites of fish are very important as they cause severe damages to fish stocks in the fish farms. The genus *Myxosoma* was established by Thélohan[16] for a myxosporidian parasite, *Myxosoma dujardini* found in the connective and gill filaments of *Scardinius erythrophtalamus* and *Leuciscus rutilus*. Since then many species were described from fresh and marine fish (Hoffman *et al.*[5]; Kudo[8–9]; Narasimhamurti[13]). In India reports on new species of *Myxosoma* are scanty. In the present paper the first report of a new species of *Myxosoma* from Rajasthan is described.

During the course of seasonal variation study of the fishes for the protozoan parasites of Parvatsar lake (Nagore, Rajasthan) the gills of *Puntius sarana* were found infected with the myxosporidian spores. No cysts or trophozoites were seen. The infection was recorded twice during the course of study. No spores could be found in other organs. Smears were prepared from the gill material fixed in Schaudinn's fluid and stained with Heidenhain's iron haematoxylin. Gills were fixed in Bouin's fluid sectioned at 10 μ and stained with Heidenhain's iron haematoxylin. These sections did not show the infection in the tissue. The spore characters were recorded and camera lucida sketches were drawn. 1% and 3% NaOH or KOH was used for polar filament extrusion.

In January 1978 the fish collected from Parvatsar lake showed the presence of myxosporidial spores on its gills. Similar infection recurred on the gills of the same host *Puntius sarana* in September 1978 along with a biflagellate ectoparasite. Observations of fresh and stained spores revealed a typical morphological feature. The shell-valve of the spore gets slightly thickened posteriorly (0·9 μ to 2·3 μ thickness) which always stains dark blue with Heidenhain's iron haematoxylin (Figs. 1, 2, 5 and 6). This particular thickening never appears in lateral views (Figs. 3 and 4). *The spores are oval to pyriform in frontal view* (Figs. 1, 2, 5 and 6). The spores are with unequal polar capsules (Figs. 5 and 6). Occasionally a few spores are seen with equal polar capsules (Figs. 1 and 2). The spore measurements of January and September collections are not the same. However, the posterior thickening persists (Table I). The single nucleus is large and prominent occupies the greater part of the granular sporoplasm and very little of the extra capsular cavity (Figs. 1, 2, 5 and 6). No iodinophilous vacuole seen and the polar filament coils in the capsules are detected when stained with Lugol's iodine. No polar filaments were extruded when treated with 1% and 3% NaOH or KOH. From the spore characters it was noticed that the parasite species belong to the genus *Myxosoma*.

*Hoffer[11] described *M. cerebralis* spores showing a typical mucous envelope around the posterior end. A similar mucous envelope in the form of two prominent lappets on either side of the spore is seen in *M. lairdi* (Narasimhamurti and Kalavathi[12]) described from the gut of *Liza macrolepis*. *M. cartilaginis* described by Hoffman *et al.*[5] shows a triangular thickening by the spore wall anteriorly and 6–9 distinct utural markings posteriorly. Richard[14] described *M. cyprini* from the gills of *Notropis latrenais* and *Notemigonus crysolecas*. Spores are with posterior mucous envelope. Hoshina[8] corrected the generic name of *Leptotheca dermatobia* (Ishii[7]) to *Myxosoma*

Fig. 1

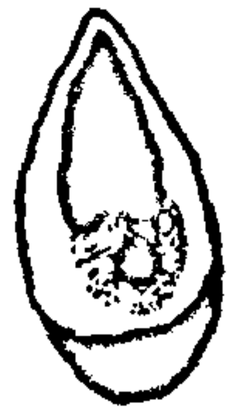

Fig. 2

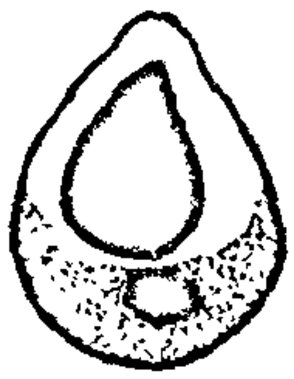

Fig. 3

Fig. 4

Fig. 6

Fig. 5

FIGS. 1–6. *Myxosoma mathurii* N. Sp. (All spores drawn from material fixed in Schaudinn's and stained with *Heidenhain's iron haematoxylin. No spores* drawn from fresh material. The characteristic posterior thickening (0·9 μ to 2·3 μ) is observed only in front *views (Figs. 1, 2, 5 and 6). Sporoplasm is always* uninucleate (Figs. 1, 2, 3, 5 and 6). Fig. 1. Front view. Oval form with equal (oval) polar capsules. Fig. 2. Front view. Pyriform spore with equal polar capsules. Fig. 3. Lateral view. Oval form with broad sides. Spore without the characteristic posterior thickening. Fig. 4. Lateral view. Large spore elongately pyriform with a slight pointed anterior tip. Observe the absence of posterior thickening. Fig. 5. Front view. Small oval form with unequal polar capsules. Fig. 6. Front view. Large spore pyriform) with unequal polar capsules.

* Not referred to in original.

TABLE I

Measurements in (μm) of Myxosoma mathurii *n.sp. (January and September collections)*

Particulars	January		September	
	Range	Mean ± Std error	Range	Mean ± Std. error
Spore length	8·7–19·7	11·07±0·5	9·2–23·5	23·2±–2·0
Spore width	5·1– 8·2	6·3 ±0·2	5·0–10·1	6·5± 0·2
Large polar capsule length	2·7– 7·8	5·4 ±0·3	5·1–11·9	7·0± 0·2
Large polar capsule width	1·8– 4·6	2·6 ±0·1	1·3– 4·6	2·6± 0·1
Small polar capsule length	2·7– 7·8	4·3 ±0·4	4·6– 6·9	5·5± 0·1
Small polar capsule width	1·8– 2·3	2·0 ± 0	0·9– 4·6	2·5± 0·1
Thickness	0·9	0·9 ± 0	0·9– 2·3	1·1± 0·07
Nucleus length	0 9– 1·3	1·0 ±0·02	0·9– 2·3	1·6± 0·09
Nucleus width	0·9	0·9 ± 0	0·9– 2·3	2·6±–0·4

dermatobia. It was reported from the integument of *Anguilla japonica*. The spores have 4–7 folds along the sutural ridge. Kudo[8] reported *M. funduli* from the gills of *Fundulus elitus* and *F. majalis*. The spores show 7–10 posterior markings. *M. catostomi* described by Kudo[8] from the gills of *Catostomus commersonii* did not possess the posterior thickening. Laird[10] reported *M. tripterygii* from *Tripterygion varium*. The spores are with equal polar capsules and a binucleate sporoplasm. *M. neurophila described by Guilford*[4] *from Perca flavescens* and *Etheostomans nigrum* (mid-brain, blood vessels) possess big capsulogenous nuclei, posterior sutural folds and a sutural ridge. Narasimhamurti[13] reported and described *M. intestinalis* from Waltair. The infection is in the form of cysts projecting into the lumen of *Mugil wagensis*. Meglitsch[12] described *M. rotundum* from *Carpiodes cyprinus* in the connective tissue of gills. Infection is in the form of cysts. Bond[2] described *M. subtecalis* form the connective tissue of *Fundulus heteroclitus* from Baltimore, U.S.A. The spores are with a characteristic median ridge and two lateral ridges. Spores of *M. muelleri* Bond[3] described from the connective tissue of *E. masquinongy* possess two quadrilateral plaques at the base of the spore. Bond[3] in the same year described *M. cuneata* from *Esox masquinongy* in gills. There is a characteristically asymmetrical wedge-shaped marking arising from the base and extending upto the middle of the sporoplasm. The present form differs from the above species in morphological features and in morphometrics. It is thus seen that the present form does not agree with any of the *Myxosoma* species described so far. This is also the first report of a *Myxosoma* species from the present host in Rajasthan. Hence it is considered new and the name *Myxosoma mathurii* n.sp. is proposed to honour Dr. P. N. Mathur, D.Sc., Research guide, of the first author.

The authors thank the Head, Zoology Department, Government College, Ajmer, for facilities. One of the authors (MJ) thank U.G.C. for the award of a fellowship.

March 1, 1981.

1. Baker, J. R., *Parasitology*, 1963, **53**, 285.
2. Bond, F. F., *Trans. Am. Micro. Soc.*, 1938, **57**, 107.
3. —, *J. Parasitol.*, 1939, **25**, 377.
4. Guilford, H. G., *Ibid.*, 1963, **49**, 474.
5. Hoffman, G. L., Putz, R. E. and Dunbar, C. E., *Protozool.*, 1965, **12**, 319.
6. Hoshina, T., *J. Tokyo Uni. Fish.*, 1952, **39**, 69.
7. Ishii, S., *Zool. Mag. (Japan)*, 1916, **28**, 271.
8. Kudo, R. R., *J. Parasitol.*, 1918, **5**, 11.
9. —, *Archiv. für. Protis.*, 1926, **56**, 105.
10. Laird, M., *Trans. Roy. Soc. N.Z.*, 1953, **81**, 1.
11. Lom, J. and Hoffman, G. L., *J. Parasitol.*, 1971, **57**, 1302.
12. Meglitsch, P. A., *Ibid.*, 1937, **23**, 467.
13. Narasimhamurti, C. C. and Kalavathi, C., *Proc. Indian Acad. Sci. (Anim. Sci.)*, 1979, **88**, 269.
14. Richard, D. S., *J. Parasitol.*, 1974, **60**, 169.
15. *Thélohan, P., *Bull. Soc. Philom.*, 1892, **4**, 165.

SEM STUDY OF SEED SURFACE IN *ARGEMONE MEXICANA* L. AND *BRASSICA CAMPESTRIS* L. VAR. *BROWN TORIA*

L. C. LAMBA AND VEENA GUPTA
Department of Botany
Kurukshetra University
Kurukshetra 132 119, India

SCANNING electron microscopy has opened a new perspective for having a closer look at seeds and seed